Adjusting System for Pre-Crash Adjustment of a Vehicle Component, in particular a Vehicle Seat

The invention relates to an adjusting system according to the superordinate concept of Claim 1.

This type of adjusting system is, for example, known from WO 01 / 45979 A1, DE 199 61 799 A1 and DE 197 49 838. In this instance, an immanent impact such as, for example, with an obstacle situated in front of the vehicle, is recognized by sensors on the vehicle and a control signal emitted by the control device to an adjusting device, so that same can set a crash – secure position of a vehicle component before the impact, for example, a restraining belt or a seat component.

In virtue of such an adjustment a higher level of crash – safety is possible in many situations. Nevertheless, frequently the time available after recognition of the pre-crash situation for adjustment of the vehicle component is too brief, in particular at high travel speeds of one's own or another's vehicle or with an inadequate performance of the adjusting device.

DE 199 39 183 C1 discloses a boarding assist, wherein upon actuating a release lever for a seat back adjustment, an adjusting motor is operated by the user for longitudinal adjustment of the seat with a higher speed that in the case of a normal comfort adjustment. DE 101 15 523 A1 discloses an aircraft seat arrangement, wherein two seats are connected via a data line and supplied with current by means of two separate systems, whereby upon failure of one component a switch-over to the partner component is done.

The object of the invention is to provide improvements upon known adjusting

arrangements and, in particular, to make possible a safe adjustment of a pre-crash position.

Said object is achieved by the adjusting arrangement according to Claim 1. The subordinate claims describe preferred further embodiments. In this case, adjustment arrangements, in particular, for adjusting one or a plurality of vehicle components as well as a window lifter or sliding roof.

The invention is based on the concept that upon recognition of a pre-crash situation, an adjustment by way of the adjusting device can be attained at a higher speed than in a normal operational adjustment, in that the supply voltage supplied to the adjusting device is increased. Naturally, in principal by applying a higher supply voltage to an adjusting arrangement, damage to the adjusting arrangement can occur because of overheating, since according to the invention the higher voltage is applied only in the pre-crash situation, there is a higher voltage supply and accordingly higher power output of the adjusting arrangement only over a short period of time, so that as a rule no or at all events a low impairment occurs, as a rule the involved components directly absorb the higher heat quantity.

According to the invention, without additional use of pyrotechnical means and without excessive equipment investment a fast, reversible adjustment of a safety – relevant vehicle component is achieved. If in the vehicle two input voltages, e.g. 12 V and 42 V, are present in the vehicle, the switching can effect a direct switchover between these supply voltage connections. If only one input voltage is available, an energy collector normally in a parallel operating position can be series connected between a supply

voltage connection and an input connection of the adjusting device.

In this fashion, even in vehicle systems with only one supply voltage, a higher supply voltage is maintained for the short span of time of the pre-crash adjustment.

The invention will be described in more detail with reference to the appended drawings and several exemplary embodiments. Wherein:

Fig. 1a	represents a vehicle seat with the operator in the comfort position;
Fig. 1b	represents a vehicle seat with the operator in the crash – secure position;
Fig. 2:	represents a block diagram of an adjusting arrangement according to the invention;
Fig. 3a	represents a wiring diagram from Fig. 2 in the normal operating position;
Fig. 3b	represents a representation corresponding to Fig. 3a in the quick adjustment position;
Fig. 3c	represents a configuration of the switching device of fig. 3a;
Fig. 3d	represents the switching device of Fig. 3c in the quick adjusting position;
Fig. 4a	represents a wiring diagram of a switching device according to a further embodiment in the normal operating position;
Fig. 4b	represents the switching device of Fig. 4a in the quick adjusting position;

A person F sits in a vehicle seat 1 with a seat part 2, seat back 4 and headrest 5. In this instance, Fig. 1a represents a comfort position adjusted by the person. Upon recognizing a pre-crash situation the vehicle seat 1 is adjusted in the crash – secure position represented in Fig. 1b with an upright back rest 4 and forward raised seat part 2. In addition, if required, the seat part 2 and / or the head rest 5 could be adjusted forward.

An adjusting arrangement 10 according to Fig. 2 has one or a plurality of electrically operable adjusting arrangements 11, which are controlled by a control device 12 via a control signal S2 or via a plurality of control signals S2.

The control device 12 can be a central control device of the vehicle, which picks up measurement signals as input signals S1, e.g. distance measuring signals, from sensors 14 and from these recognizes a pre-crash situation. In addition, the control device 12 can also be a decentralized control device, which is used by the user for adjusting the vehicle seat 1; in this instance, the control device 12, picks up a pre-crash signal from a central control device.

The control device 12 emits, after recognizing a pre-crash situation, a control signal S2 to the adjusting device 11, as well as a switching signal S3 to a switching device 13. The switching device 13 is connected at the input side in the embodiment of Fig. 3 to two supply voltage connections A1 and A2 and in the embodiment of Fig. 4 to three supply voltage connections A1, A2, A3. On the output side 13, input connections B1 and B2 of the parallel connected adjusting devices 11 are connected.

The adjusting devices 11 are switched on by means of the control signals S2. An increase of the supply voltage emitted at the input connections B1, B2 is reached by means of the switching signal S3, as explained in the embodiments of Figures 3 and 4.

In the embodiment of Fig. 3 in the normal operating position of the switch device 13 the first and second supply voltage connector A1, A2 having potentials of 12 V or ground are connected directly to the input connections B1, B2 of the adjusting devices 11. Accordingly, the output voltage equal to the input voltage U1 of 12 V. An energy

collector 15, advantageously a power capacitor with a capacity in the range of up to several Farads, up to 4 Farads for example, is switched into the normal operating position parallel to the adjusting device 11; that is, its first storage connection E1 lies at the positive supply voltage connector A1 and its second storage connection E2 is on the second supply voltage connector A2; that is, on ground.

In the quick adjustment position of Fig. 3b, the energy storage 15 is wired between the second supply voltage connection A2 and a second input connection B2, so that during a subsequent period of time – as long as the energy storage 15 can hold its output voltage – between B1 and B2 the doubled supply voltage U2 of 24 volts is applied, if applicable, the voltage U2 in this case diminishes somewhat; however, even with a fall in voltage, an increase of the voltage U2 on the input connections B1, B2 vis-à-vis U1 is achieved.

Fig. 3c and 3d represent a switching configuration with two switches SW1, SW2; namely an opening switch SW1 and a reversing switch SW2, which is appropriately switched by means of the switching signal S3; in the alternative, for example, three opening switches can also be used.

The embodiment of Fig. 4 is suitable for a vehicle having a two-voltage on-board electrical system hence 3 supply voltage connectors A1, A2, A3. In his instance, A2 is on ground, A1 on a potential of 12 V and A3 on a potential of 42 V. In this case, a switch SW3 places, in dependence on the switch signal S3, the first input connection B1 on the first supply voltage connector A1, whereby the normal operating position shown in Fig. 4a is reached, or on the third supply voltage connector A3, whereby the quick adjustment position shown in Fig. 4b is reached.